

Bowen Mill Bridge
Spanning Pine River on CTH AA
Vicinity of Richland Center
Richland County
Wisconsin

HAER No. WI-67

HAER
WIS
52-RICH.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

BOWEN MILL BRIDGE

HAER
WIS
52-RICH.V.
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Location: County Trunk Highway AA over the Pine River
Vicinity of Richland Center, Richland County, Wisconsin

USGS Richland Center Quadrangle, Universal Transverse Mercator
Coordinates:
Zone 15 Easting 711970 Northing 4805366

Present Owner: County of Richland

Present Use: Vehicular bridge

Significance: The Bowen Mill Bridge is a Pratt through truss. It was erected in 1907, and re-erected at its present location in 1966. Of the thirty-two Pratt through truss bridges identified by the Wisconsin Historic Bridge Advisory Committee as having been built between 1895 and 1910, eight were identified in Cultural Resource Management in Wisconsin, the state's manual for historic properties, as the best examples of that bridge type. The Bowen Mill Bridge is one of those eight, and the only one in southwestern Wisconsin. It is locally significant, therefore, as a unique example of this type and period of construction in Richland County specifically, and southwestern Wisconsin in general.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: 1907, 1966.¹
2. Architect: Unknown.
3. Original and subsequent owners: Public ownership.
4. Builders, suppliers:
 - A. Builders: V.J. Valentine (1966).²
 - B. Suppliers: Lackawanna Steel³

¹Truss-Bridge Intensive Survey Form (Bridge #P-52-49), Wisconsin Department of Transportation, Madison, Wisconsin.

²Ibid.

³Bridge inspection, 1 August 1992.

5. Alterations and additions: This bridge was moved to its present side in 1966. The change in location notwithstanding, its historical fabric is excellent.

B. Historical Context:

TRUSS BRIDGE DESIGN: GENERAL

[The Wisconsin Department of Transportation sponsored a study of truss bridges in the state in 1987. A report authored by Jeffrey A. Hess, Robert M. Frame, and Robert S. Newbery was the major product of this project. The following material is taken directly from that report, although in some cases editorial changes are made to create a concise version herein. Footnote numbers differ from those in the original text, but their placement is identical. Footnotes are also transcribed exactly as written by Hess, Frame and Newbery. The reader is directed to Hess, Frame and Newbery for bibliographical references.]

There are three essential aspects of a truss. First, a truss is a combination of relatively small members which are "framed or jointed ... to act as a beam."⁴ Second, each component member is subjected only to tension or compression. (Tensile forces tend to stretch or elongate a member while compressive forces tend to push or compress a member.) Third, the component members of the truss are configured in triangles because "the triangle is the only geometrical figure in which the form is changed only by changing the lengths of the sides."⁵ In other words, the triangle remains rigid until the forces applied distort or break the material used in the components.⁶

A truss bridge consists of two trusses, each with a top chord, bottom chord, and endposts. The space enclosed by these members is called the web. The web members reinforce the truss. The particular arrangement of the web members was the subject of much study in the mid and late nineteenth century, and different names were given to trusses with different web configurations. The two most popular types of trusses in Wisconsin were the Pratt and Warren.

Truss bridges are generally divided into three categories: pony or low

⁴J.B. Johnson, C.W. Bryan and F.B. Turneure, The Theory and Practice of Modern Framed Structures 8th ed. (New York: John Wiley & Sons, 1905) p. 3. In other words, the "assemblage had rigidity and behaved as a unit." Ellis L. Armstrong, History of Public Works in the United States, 1776-1976, American Public Works Association, 1976, p. 109.

⁵Milo S. Ketchum, Design of Highway Bridges and the Calculation of Stresses in Bridge Trusses (New York: Engineering News Publishing Company, 1908), p. 1.

⁶A rectangle, on the other hand, can become a parallelogram as everyone with a sagging screen door knows. The common solution to the sagging door is to run a small rod diagonally across it, thus creating two triangles. The resulting figure looks remarkably like one panel of a 19th century Pratt truss.

trusses, overhead or through trusses, and deck trusses.⁷ Both pony and overhead trusses carry the traffic between the trusses and the roadway is at or near the bottom chord of the trusses. A deck truss carries the roadway at or near the top chord: thus, the roadway is on top of the trusses.

TRUSS BRIDGES IN WISCONSIN

[The following material is taken directly from the aforementioned Hess, Frame, Newbery report.]

On Wisconsin highways, the predominance of metal-truss bridges for crossings of all lengths seems to have lasted from about 1890 to 1910. Trusses remained an important bridge type in Wisconsin until the advent of World War II, but after 1910, most short crossings (less than 35 feet) employed girder, beam, or slab spans of steel and/or concrete. The Wisconsin State Highway Commission (SHC), established in 1911 to improve the quality of road and bridge construction in the state, was particularly enthusiastic about using concrete for culverts and small bridges.⁸

The two truss designs that came to dominate highway bridge construction by the late nineteenth century were the Warren and the Pratt. The Warren truss was patented by two British engineers in 1840. In this design, the vertical members handle only nominal stress, while the diagonals serve as both tension and compression members. The vertical members, like the diagonals, were usually paired angles, but of smaller dimension. In Wisconsin, Warren trusses are by far the most common type of highway truss, having been promoted by the SHC after 1911. Of the approximately 450 Warren trusses in Wisconsin in 1980, over four-fifths were riveted pony trusses built according to SHC standard plans.⁹

The Pratt truss, patented by Caleb and Thomas Pratt in 1844, features vertical compression members and diagonal tension members. Although originally built as a combination bridge, however, the Pratt had the advantage because it used less iron and was easier to erect. The oldest

⁷American Association for State and Local History Technical Leaflet 95, History News, vol. 32, No 5, May 1977; T. Allan Comp and Donald Jackson, "Bridge Truss Types: A Guide to Dating and Identifying," pp. 5, 6-7. Ketchum, Design of Highway Bridges, pp. 5-11.

⁸Hans Nelson Brue, "The Development of Highway Bridges in Wisconsin," Bachelors Thesis in Civil Engineering, University of Wisconsin, 1916, pp. 4-5. The historical record is sketchy here, and there is no reliable census of bridges by type for this period. The 1880s and 1890s saw a large number of metal trusses built, often with some controversy of the higher first cost when compared to the familiar old wooden bridge. It was not just a phenomenon of the late 19th century. Simple wood beam, beam and pier, and truss bridges were recommended for the cost-conscious land owner in Frederick S. Langa's "Bridge Your Way to a Low-Cost Lot," Rodale's New Shelter, April 1981, pp. 66-75.

⁹T. Allan Comp and Donald Jackson, "Bridge Truss Types: A guide to Dating and Identifying," American Association for State and Local History, Technical Leaflet 95, History News, 32 (May 1977): Working Files, HBAC.

existing truss bridge in Wisconsin, the 1877 White River Bridge in Burlington, is a Pratt.¹⁰

During the 1870s, an important variation of the Pratt design was introduced for long span bridges. Because the depth of truss required in the center of a bridge is greater than at the abutments, a considerable amount of material can be saved on a long span structure by "bending" the top chord into a polygonal configuration. This creates a "Parker" truss. If the top chord has exactly five sides, the bridge, by convention, is called a "camelback" truss. The addition of subtrusses and/or subties makes a Pratt into a Baltimore and a Parker into a Pennsylvania.¹¹

The Pennsylvania truss was a "major advance in strengthening the Pratt truss." The Pennsylvania's distinctive features, an inclined top chord for economy of material and panel subties or subtrusses for greater strength, were a response to the increasing live loads of railroad locomotives and rolling stock. This style truss is generally found in the United States with lengths of 250 to 600 feet.¹² None of Wisconsin's remaining Pennsylvania's are of such length. The preference in Wisconsin seems to have been for multiple-span bridges with shorter span lengths. The longest known Pennsylvania truss in Wisconsin is the 1908 Cobban Bridge with two spans of 241 feet each.

The development of the Pratt and its variations was influenced by a debate over the merits of pin connections versus riveted connections for main truss members. Proponents of riveted bridges usually cited the advantages of increased structural rigidity and the reduction of damaging vibrations. In pin-connected bridges, vibrations caused the pin to grind on the eye-bar, thus enlarging the pin hole. Advocates of pin-connected bridges, on the other hand, emphasized the theoretically correct distribution of stresses and the smaller amount of metal required. They also criticized the difficulty of ensuring that a riveted joint was properly fabricated, especially in the field. The pin-connected bridge, they argued, was the reason why Americans surpassed the rest of the world in bridge building.¹³

¹⁰Comp and Jackson, "Bridge Truss Types." A few small Howe trusses were built, including, apparently, one built in Watertown in 1875. Kromm, "Milford Bridge," p. 2.

¹¹Comp and Jackson, "Bridge Truss Types."

¹²American Association for State and Local History Technical Leaflet 95, History News, Vol. 32, No. 5, May 1977; T. Allan Comp and Donald Jackson, "Bridge Truss Types: A Guide to Dating and Identifying," pp. 5, 6-7. See also J.A.L. Waddell, Bridge Engineering (New York: 1921), pp. 176, 177; J.B. Johnson, W.W. Bryan, and F.E. Turneure, The Theory and Practice of Modern Framed Structures (New York, 1905, (1893)), p. 275; Milo S. Ketchum, The Design of Highway Bridges (New York: 1908), p. 212; Henry G. Tyrrell, History of Bridge Engineering (Chicago: 1911), pp. 184-192.

¹³Waddell, Economics of Bridgework, pp. 73-74; Boller, Practical Treatise on the Construction of Iron Highway Bridges, pp. 44-49; "Discussion of American Railroad Bridges," American Society of Civil Engineers, Transactions 26 (No. 429, December 1889), p. 593. According to Boller (p. 47), "Whatever objection has been urged against shop-riveting is intensified in a high degree when the field-riveter steps in

The issue of pin versus riveted connections was complicated by practical factors including machinery, tools, and power sources, both in the shop and in the field. The debate also was easily sidetracked by tangential issues, as for example, when some commentators denied that the pin per se, was the most important feature of "characteristically American" bridgework. In addition, both connection types came to incorporate features that were not an intrinsic part of the design. Many early riveted spans, for example, used the lattice girder (or multiple triangulation design), which was clearly excessive in material, while many pin-connected bridges were dangerously light, particularly in their details. Thus, a fair comparison between the two systems was not always made.¹⁴

According to J.A.L. Waddell, the controversy raged in engineering circles for a dozen years around the turn of the century. No dramatic resolution of the issue occurred, but "time and steady development of the real science of bridge designing" gradually changed minds. Significant changes in riveting technology also altered the terms of the debate.¹⁵ A compromise of sorts was finally reached, resulting in the adoption of the best features of each design. Riveted bridges were designed with less duplication of members and pin-connected bridges, suitably detailed, were still accepted for long span highway bridges.¹⁶

In Wisconsin, SHC officials clearly favored riveted construction from an early date. Consequently, the distinction between pin connections and riveted connections establishes an important subcategory boundary, separating the era of state-planned bridges from the preceding period in which bridge companies were largely responsible for bridge design. As early as 1908, state engineers advocated the use of riveted pony trusses for short-span bridges.¹⁷ When the SHC was formally established in 1911, the riveted Warren became the state's standard pony design. In that year, the SHC also drafted a standard plan for riveted, overhead, Pratt trusses, and

to do his part of the work." For an argument that pin-connected Pratt trusses require more metal than riveted Warren trusses, see Johnson, et. al., Modern Framed Structures, p. 276.

¹⁴Waddell, Economic of Bridgework, p. 7; "The Development of Bridge Trusses," Engineering Record, 42 (November 3, 1900):411.

¹⁵Fowler, "Some American Bridge Shop Methods," "Machinery in Bridge Erection," Cassier's Magazine, 17 (January, February 1900), pp. 200-215, 327-344; "Pneumatic Percussion Riveters," Engineering News, 39 (March 3, 1898), pp. 148-149; "Field Riveting by Power," Engineering News, 42 (October 27, 1900), p. 385; "Pneumatic Field Riveting in Railway Bridgework," Engineering News, 42 (October 27, 1900), pp. 393-394.

¹⁶Waddell, Economics of Bridgework, p. 74; "Development of Bridge Trusses," p. 411.

¹⁷See, for example, the photograph of "a riveted steel [Pratt pony truss] highway bridge 40' span...built under the supervision of the Highway Division" in Arthur H. Hirst and M. W. Torkelson, Culverts and Bridges (Madison, Highway Division, Wisconsin Geological and Natural History Survey, Road Pamphlet No. 4, second edition, 1908) p. 43. The SHC standard plan (dated 1908) for a riveted Warren pony truss with a 40 foot span is found in Microfilm Reel M-1, "Miscellaneous Standards," Bridge Section, WisDOT.

by 1914, the agency had adopted riveted construction for all overhead Pratt variations. As SHC engineer A.R. Hirst wrote in 1913, "Very seldom do we use a pin-connected truss...."¹⁸

In the mid-1930s, the SHC seems to have developed a preference for overhead Warren trusses for long-span bridges, although some overhead Pratts continued to be built. Riveting remained dominant in bridge building until well after World War II. As late as 1931, the construction specification of the American Association of State Highway Officials (AASHO) stated, "welding of steel shall not be done except to remedy minor defects and then only with the approval of the engineer." Shortly after the war, however, riveting rapidly disappeared, replaced by welding and high strength bolts.¹⁹

[The Bowen Mill Bridge is a Pratt Through Truss with pinned connections.]

THE STATE HIGHWAY COMMISSION (SHC)

[The following material is taken directly from the aforementioned Hess, Frame, Newbery report.]

The involvement of local governments in bridge repair, replacement, and construction projects was the subject of numerous laws in the late 19th century. With the Good Roads Movement of the late 1890s and early 1900s, a specific set of proposals were put forth for greater involvement by the State government in promoting good quality bridges.²⁰

In 1907, the state legislature established a Highway Division within the Wisconsin Geological and Natural History Survey to conduct experiments in road design and to advise local governments about specific projects. Town governments, traditionally reluctant to hire an independent engineer to assist in bridge building, could now avail themselves of free engineering counsel from the state. At the same time, the legislature required counties to make a commitment to professional oversight and increased

¹⁸A.R. Hirst, "Bridges and Culverts for Country Roads," Engineering News (October 9, 1913), p. 729. With minor modifications, these standards are reiterated in Wisconsin Highway Commission, Second Biennial Report, p. 24.

¹⁹U.S. Department of Transportation, Federal Highway Administration, "Design and Construction of Welded Bridge Members and Connection," Washington, D.C., 1980, pp. 1, 6-9.

²⁰Ballard Campbell, "The Good Roads Movement in Wisconsin, 1890-1911," Wisconsin Magazine of History, 49 (Summer 1966), pp. 273-93; M.C. Davis, A History of Wisconsin Highway Development, 1825-1945 (Madison, 1947), pp. 218-222; Wisconsin Statutes, Second Session of the Legislature, January 10, 1849 (Southport, 1849), pp. 182-183; Town Laws of Wisconsin, 1858, p. 157; Legislature of Wisconsin, Private and Local Laws, 1867, pp. 60-61, 179-182; Laws of Wisconsin, 1881, Chapter 315, pp. 407-408; Laws of Wisconsin, 1885, Chapter 187, pp. 162-164; Richard N. Current, The History of Wisconsin: Volume 2, The Civil War Era, 1848-1873 (Madison, 1976), p. 28; Robert Nesbit, Wisconsin, A History (Madison, 1973), p. 197. A sampling of available county board records suggest that county-aid bridge projects were infrequent during the 1880s, and numbered five to ten per county per year during the 1890s.

funding by appointing "a competent engineer or experienced road builder" to serve as County Highway Commissioner and by levying a tax of not less than one-fourth nor more than two mills on the assessed valuation of all country property for the county road and bridge fund.²¹

In 1908, Wisconsin voters removed the greatest obstacle to creating a progressive statewide system of bridge and highway construction. In that year, by a three-to-one margin, they eliminated the state's constitutional prohibition against direct state aid to transportation projects. When the Legislature made its first appropriation for highway improvements in 1911, it also transformed the Highway Division of the Geological Survey into autonomous State Highway Commission (SHC), which was given the responsibility of overseeing the expenditure of state funds for the development of a state highway network.²²

Like the former Highway Division, the SHC emphasized the use of standardized plans for various types of bridges and culverts.²³ The first set of standardized truss plans encompassed spans ranging from 36 to 128 feet, generally in five-foot increments. All but one had a sixteen-foot roadway. Revised several times by the 1920s, these plans gradually provided for wider bridges, and continually incorporated the latest engineering wisdom and detailing.²⁴

In the first three and one-half years of its work, the SHC designed over 1,500 bridges of all types. All were designed to carry a live load of 15 tons. Believing firmly in the use of reinforced concrete to "the fullest extent practical," the SHC was pleased that all but three of their designs had concrete floors. These figures included almost 900 bridges requested by local governments in 70 counties. Practically all the local bridges in the state during these years were either designed by the SHC or were based on SHC standard plans.²⁵

Despite its enthusiastic support for concrete construction, the SHC declared in 1926 that the steel bridge "is not looked upon with disfavor," and it continued to refine its truss designs. In the late 1930s, it made a major commitment to keeping its standardized plans up to date by dropping the Pratt design in favor of the Warren all overhead truss configurations. Newly

²¹Campbell, "Good Roads," pp. 278-79; Laws of Wisconsin, 1907 (Madison, 1907), Chapter 552, p. 292.

²²Campbell, "Good Roads," pp. 279-84; Davis, Wisconsin Highway Development, p. 104.

²³SHC, Second Biennial Report, July 1, 1911 to January 1, 1915 (Madison, 1915), p. 24.

²⁴WisDOT, Bridge Section, Microfilm Reel M-1.

²⁵Davis, Wisconsin Highway Development, pp. 112-13; SHC, Second Biennial Report, pp. 21, 14, 30; see also SHC, Preliminary Biennial Report, July 1, 1911 to January 1, 1913 (Madison, 1913), p. 17

completed SHC designed truss bridges, both monumental and modest, also continued to be featured in the photographic sections of the agency's biennial reports. Nevertheless, the SHC clearly favored concrete spans, citing advantages of lower cost, greater compatibility with aesthetic treatment, and greater adaptability to remodeling, especially in terms of roadway widening.²⁶ The metal truss, however, remained cost effective in many situations, and the SHC continued to design some truss bridges until well after World War II.

[The Bowen Mill Bridge was designed and built in the period immediately before the State Highway Commission began designing most of the bridges built in the state.]

HISTORIC BRIDGE ADVISORY COMMITTEE (HBAC)

[The following material is taken directly from the aforementioned Hess, Frame, Newbery report.]

The systematic study of Wisconsin truss bridges began in 1976. Under the sponsorship of the State Historic Preservation Office (SHPO) of the State Historical Society, George M. Danko produced two volumes. The first volume was based on an extensive literature search, and traced related developments in engineering, metallurgy, and manufacturing to provide a general historical overview of truss-bridge design and construction on both a state and national level. In 1977, Danko conducted an intensive field survey of truss bridges in 11 Wisconsin counties. Using the records of the Wisconsin Department of Transportation (WisDOT), he focused his study on counties which he hypothesized would have both a high concentration of truss bridges and high replacement pressures. Danko's second volume included intensive survey forms for 35 bridges. He indicated on the forms which ones he thought were significant.²⁷

By 1890, when WisDOT established the Historic Bridge Advisory Committee (HBAC), seventeen bridges had been listed in or found eligible for listing in the National Register of Historic Places. Neither Danko's studies nor the individual nominations and determinations of eligibility provided a fully developed statewide historical and chronological context for specific criteria for rating truss bridges. The goal for HBAC, then, was a statewide inventory that would expedite the evaluation of truss bridges, which, in

²⁶The SHC succinctly assessed the pros and cons of steel and concrete bridges in its Sixty Biennial Report, 1925-1926 (Madison, 1926), p. 67. From 1911 to 1915, truss bridges in Wisconsin cost considerably less per foot than concrete structures, but then steel began its "great advance in price." See SHC, Fourth Biennial Report, 1916-1918 (Madison, 1918), pp. 11-12; see also the comparative cost chart in Engineering News, 47 (February 28, 1917).

²⁷George M. Danko, "The Development of the Truss Bridge, 1820-1930, with a Focus Toward Wisconsin," unpublished report prepared for the State Historic Preservation Office, State Historical Society of Wisconsin, 1976; Danko, "A Selective Survey of Metal Truss Bridges in Wisconsin," unpublished report prepared for Historic Preservation Division, State Historical Society of Wisconsin, 1977.

1980, accounted for approximately one-tenth of the state's 10,386 surviving highway bridges built before 1950.

The HBAC was guided by the basic assumption that all distinctive types of truss bridges are worthy of some degree of preservation. Thus, the planning for the statewide survey focused on two major information sources in the WisDOT Bridge Section: (1) a card file containing rudimentary structural information and a photograph for every highway bridge in the state; (2) a computerized data bank adapted to meet the FHWA's interest in a statewide inventory to promote an engineering evaluation of all bridges in the state. These two sources generated an initial pool of 996, pre-1941 truss bridges representing 18 structural types.²⁸

On the basis of data derived primarily from WisDOT sources, the initial pool was carefully studied to identify, for each truss type, those bridges which had the earliest known construction dates, were in the best condition, had the best available historical data (e.g. bridge plates, SHPO research files, previous historical studies), and had the most obvious noteworthy features (e.g. longest span, greatest number of spans, unusual workmanship). This winnowing reduced the initial pool by approximately 75 per cent. Up to this point, the study had focused exclusively on bridges on or over public thoroughfares, including city streets, county highways, and town roads. Some bridges of historical interest, however, were known to exist in park settings, and these also were included in the study. With these additions, the study sample totaled 247 bridges.

To determine the most significant bridges within each truss category, a set of evaluation criteria, with a corresponding numerical rating system, was developed from the model developed by Virginia.²⁹ A trial run was conducted on the bedstead-truss (truss-leg) category. Because this category consisted of only 8 examples, it was possible to rate all examples and compare the results with a "subjective" analysis of the entire group. The criteria were revised in light of this experience and then applied to each category with more than a dozen examples. Evaluations included a field review of the structure, and, when time permitted, limited historical research. Results were presented to HBAC at bimonthly meetings. Members of the HBAC found a slide show to be a useful complement to the evaluation sheet and other printed materials.

The HBAC evaluation process yielded a final group of 53 bridges deemed potentially eligible for the National Register. A thematic determination of eligibility, however, was not completed, and some attrition occurred. In

²⁸Originally, Pratt Pony trusses with a single vertical member were considered to be a separate category, but this distinction was subsequently dropped and the number of categories was reduced to 17.

²⁹Howard Newlon, Jr., "A Trial Rating System for Bridge," Interim Report No. 1, Criteria for Presentation and Adaptive Use of Historic Highway Structures, Virginia Highway and Transportation Research Council, 78-R29.

1986, WisDOT re-evaluated the remaining truss bridges, selected "next-best" substitutes for those that had been replaced, and initiated an intensive survey to document authoritatively the National Register eligibility of the sample. The field survey was conducted, on a contract basis, by historians Jeffrey A. Hess and Robert M. Frame III. The intensive field survey sample contained a total of 54 bridges, including two which were already on the National Register (P-18-720 and P-53-162) for which additional information was desired. In addition to an in-depth field inspection, the consultants compiled historical research dossiers on the various bridges from local and state archives, libraries and local residents.

BOWEN MILL BRIDGE

Euro-American settlement in Richland County began in the late 1830s.³⁰ Early settlers found the county quite wooded. The Southern Mesic Forest, with its Sugar Maple, Basswood and Elm trees covered all but the county's southeastern corner, which contained the Bur Oak and White Oak trees, and the Bluestem grasses of the Oak Savanna Forest.³¹ The tree cover prompted the establishment of a timber industry, indeed an industry that was needed to clear the land for farming. Once the land was cleared, agriculture developed quickly. Of the county's 373,800 acres, only 22,770 were devoted to farming in 1850. But, by 1870, there were 2,278 farms occupying 223,243 acres, and in 1890 there were 2,720 farms utilizing 326,409 acres.³² These farms produced substantial amounts of wheat, hay, corn, oats and barley over time, as well as raised many swine, sheep and cattle.³³

As the agricultural industry grew, so did the need for agricultural support communities -- towns that would provide the services farmers needed to mill, sell and ship their produce, as well as provide the supplies that they needed to survive on their farms. In Richland County, the village of Richland Center became the primary support community. Richland Center's evolution notwithstanding, other small support centers also developed. One such center occupied what came to be known as the Bowen Mill area.

Located on the Pine River, approximately two miles directly north of Richland Center, James Cass became the first businessman in the Bowen

³⁰James H. Miner, ed., History of Richland County, Wisconsin (Madison: Western Historical Association, 1906), pp. 40-41.

³¹Early Vegetation of Wisconsin (Madison: University of Wisconsin Extension - Geological and Natural History Survey, 1965), map.

³²State of Wisconsin: 1985-1986 Blue Book (Madison: State of Wisconsin, 1985), 711; A Century of Wisconsin Agriculture, 1848-1948 (Madison: Wisconsin Crop and Livestock Reporting Service, 1948), 87.

³³For example, 16,307 acres in the county were devoted to wheat production in 1890, the same year in which 35,026 acres were planted in hay, 24,812 acres were producing corn and 21,743 acres were devoted to oats. As well, there were 25,856 swine, 36,400 sheep and 31,135 head of cattle in the county in 1890.

Mill area when he opened a sawmill in 1851. William Bowen arrived in the vicinity in 1854, and eventually acquired about 500 acres of land. Providing services to farmers that likely did not want to go all the way to Richland Center, the Bowen Mill area boasted a grist mill, saw mill and store by 1874.³⁴ The hamlet grew, and by 1894 included a feed mill, church, blacksmith shop and several other structures on both sides of the river.³⁵ After the turn of the century, however, activity around Bowen Mill began to decline.³⁶

As farmers came to conduct business in the Bowen Mill area, and later as they passed through on their way to Richland Center, they needed to cross the Pine River. Accordingly, county plat maps suggest that a bridge existed at the Bowen Mill site as early as 1874. Little is known of the earlier Bowen Mill bridge[s]. We do know that in 1965 or 1966 a bridge collapsed, and that its demise was the motivation behind moving the present bridge to the site.

The present Bowen Mill Bridge was originally one span of a bridge that crossed the Wisconsin River at Spring Green. The bridge contained four Pratt through truss sections and one swing-bridge section, and was built by the Wisconsin Bridge and Iron Company in 1906-1907. It remained in service until November, 1948 when one span collapsed under the weight of a car and truck, an accident that killed a passenger in the car.³⁷ As that structure was removed, at least one span was retained for future use.

Clearly, the Bowen Mill Bridge is situated at a site where a bridge promoted late nineteenth commercial activity, and later helped farmers who lived northwest of Richland Center reach the town by offering a ready place to cross the Pine River. But since the present bridge was not associated with this historic crossing, it gains no significance from that activity. Instead, the present Bowen Mill Bridge is significant as a good example of a Pratt through truss that was designed and built in the period immediately before that in which the State Highway Commission took over those responsibilities. It is the only example of this type of bridge selected by the Historic Bridge Advisory Committee to exist in Richland County in particular, and southwestern Wisconsin in general. Although this bridge does not have the integrity of its original setting, the fact that it was moved to the site does

³⁴Atlas of Richland County, WI (Harrison & Warner, 1874).

³⁵Plat Book of Richland County, WI (Minneapolis: C.M. Foot & Company, 1895), p. 16.

³⁶Richland Rustic [Map?] (Rockford, IL: W.W. Hixson & Company, 1903), n.p.; Standard Atlas of Richland County, Wisconsin (Chicago: George A. Ogle & Company, 1919), n.p.

³⁷"Times and Transportation Have Changed But 42 Years Ago, Just As Today, Everyone Was Talking 'Bridge,'" The Weekly Home News, 18 November 1948; "Bridge Repairs Await Investigator's Findings, Says Chief Engineer; Eventual New Structure Planned," The Weekly Home News, 18 November 1948;

not diminish its engineering significance. Indeed, as was noted in Cultural Resource Management in Wisconsin, "such mobility should be viewed as proof of the intrinsic engineering value of iron trusses."³⁸

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural Character: The Bowen Mill Bridge was erected in 1907, and re-erected in its present location in 1966. It is a good example of a single span, Pratt through truss.
2. Condition of fabric: The bridge originally was one span of the multi-span Spring Green/Wisconsin River bridge. When that structure collapsed in 1948, this span was saved and later utilized as a single span bridge. Its dismantling and re-erection notwithstanding, the historic fabric of this bridge appears to be in good condition. There are no apparent alterations. The structural integrity of the bridge's individual components, however, is thought to be deteriorating as an 8 ton weight limit has been placed on the structure and a replacement has been proposed.

B. Description:

The bridge's length is 118 feet 8 inches overall on the roadway, width is 18 feet, and it carries two lanes of traffic. Resting on a concrete abutment on the south and a stone/concrete abutment to the north, the traffic deck is carried by six floor beams, each of which is an eighteen inch by six inch, rolled "I" beam. Perpendicular to the floor beams and extending from beam to beam are six, 9 1/4 inch by 4 3/8 inch, rolled "I" beam deck stringers. The bottom lateral bracing is comprised of 1 1/8 inch square rods that are threaded and bolted. The deck is timber with a macadam over-lay.

The floor beams are hung from six, double 7 inch channel hip and intermediate verticals with lacing front and back (overall dimensions 7 x 10 inches). The inclined endposts and the top chords are 14 inch by 10 1/2 inch. Each is two channels, connected with lacing and cover plates. Top lateral bracing is comprised of squared, 7/8 inch rods. The top struts are double, back-to-back, 3 inch by 2 1/2 inch angles, with cross lacing. Top strut bracing (positioned much as portal braces normally are) is paired 3 inch by 2 1/2 inch angles. Portal bracing, the lacing of which resembles a "W," is constructed with paired 3 inch and 2 inch angles.

Diagonal member dimensions vary with each panel. Those in panels 2 and 6 consist of paired, 3 inch by 1 inch rectangular bars, while those in panels

³⁸Barbara Wyatt, ed., Cultural Resource Management in Wisconsin (Madison: State Historical Society of Wisconsin, Historic Preservation Division, 1986), Transportation 12/20.

3 and 5 are paired, 2 inch by 3/4 inch bars. Diagonals in panel 4 are pairs of squared, 7/8 inch rods. Bottom chords are paired, 3 1/2 inch by 7/8 inch, rectangular eyebars.

All major joint connections are pinned.

The Bowen Mill Bridge is a functional, rural structure. In keeping with the original, as well as the contemporary rural setting, it has no ornamentation or decorative features.

C. Setting:

This bridge is located approximately 2 miles north of Richland Center, Wisconsin, on the Pine River. Oriented on a northwest/southeast axis, the bridge is surrounded by generally flat fields and the old mill pond bottoms. Several single family, post-World War II houses are located along the southeast approach to the bridge.

PART III. SOURCES OF INFORMATION

A. Bibliography:

1. Primary and unpublished sources: None
2. Secondary and published sources:

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30 November 1992

PART IV. PROJECT INFORMATION

This project has been sponsored by the Wisconsin Department of Transportation. Mead & Hunt, consulting engineers in Madison, Wisconsin, formally acted as the contracting agency. The project was undertaken by Dr. John N. Vogel, Principal Investigator and Historian for Heritage Research, Ltd., who provided the photographic work, the architectural/technical data, and the local context. Through a report that they prepared for the Wisconsin Department of Transportation, and that provides the context for bridge projects across the state, Jeffrey Hess, Robert Frame and Robert Newbery also contributed significantly to this project.

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